

Contributions to the Dragonfly fauna of the Sondaic Area,¹⁾

by

M. A. LIEFTINCK,
Amsterdam.

I.

(Text-figures 1—32).

During the past two years, several collections of Odonata have been sent to me for examination, among which a very extensive collection from Java is by far the most important. It was my intention to include the new discoveries, especially those from Java, together with a general review of all the old records known from this island, in a descriptive and fully illustrated paper, which would help the resident entomologists to get a reliable knowledge of the Javanese dragonflies. For this purpose an extensive collection is indispensable, but owing to the long time required for digesting the large quantity of Museum-notes or additional records, and to avoid delay in the publication of certain new species, I have preferred to publish the latter from time to time in separate papers. Though it is evident, that I have at my disposal for study a very considerable amount of material from this Island, mostly collected by Mr. F. C. DRESCHER (Bandoeng) and Mr. G. OVERDIJKINK (previously Soekaboemi), it will be evident equally that very much remains to be done before it becomes possible to assume that our knowledge of the occurrence and distribution of species constituting the Javanese dragonfly fauna is in any degree exact. As usual, all species have been figured from

¹⁾ With an Appendix and text-figures 33—34.

dry, well-preserved examples, with a drawing prism (including fig. 10).

Notes and descriptions of new species:

Drepanosticta gazella, sp. n. — Java.
Drepanosticta spatulifera, sp. n. — Java.
Drepanosticta sundana Krüger. — Java.
Aciagrion aciculare, sp. n. — Java.
Ceriagrion praetermissum, sp. n. — Java.
Heliogomphus drescheri, sp. n. — Java.
Heliogomphus blandulus, sp. n. — Borneo.
Microgomphus chelifer Selys. — Malacca.
Microgomphus thelyphonus, sp. n. — Java.
Burmagomphus inscriptus Selys. — Java.
Onychogomphus geometricus Selys. — Java.
Onychogomphus banteng, sp. n. — Java.
Mesogomphus reinwardti Selys. — Java.
Gomphidia caesarea, sp. n. — Borneo.

***Drepanosticta gazella* sp. nov. (figs. 1—3).**

14 ♂, 14 ♀, Java occ., res. Banjoemas, Batoerraden, G. Slamat, 2500 ft., leg. F. C. DRESCHER. Dates: 16. XII. 1927; 26. II, 15—16. IV, 1—2. V, 7—14. VI, 20—22. X. 1928. — Holotype ♂ 13. VI. 1928; Allotype ♀ 9. VI. 1928. — Coll. m.

♂ adult. — Labium dark brown. Base of mandibles, anteclypeus and labrum ivory-white, the latter broadly bordered with black. Rest of the head deep black. Eyes black. Prothorax strikingly flesh-coloured white; anterior lobe with a black spot in the centre. Posterior lobe highly specialized, clearly defined, deep black, at each outer angle with a long and thin ensiform process, directed almost vertically upwards at base and curled forward at the tip, where it is pointed (fig. 1). Synthorax for the greater part deep glossy black, with rich bronze metallic reflex, marked on the mesepimerum with an ivory-white band. Metepimerum, hinder part of the metepisternum and posterior half of the poststernum flesh-coloured. Legs, including coxae, flesh-coloured; femora with pale brown longitudinal streaks on the outer sides and dark knees. Abdomen dark blackish brown, with small yellowish

brown rings on segment 3-7 at their bases. Segm. 8 pale yellowish brown laterally. Dorsum of segm. 9 sky-blue. Segm. 10 and anal appendages black (fig. 2). Wings hyaline. *Ab*

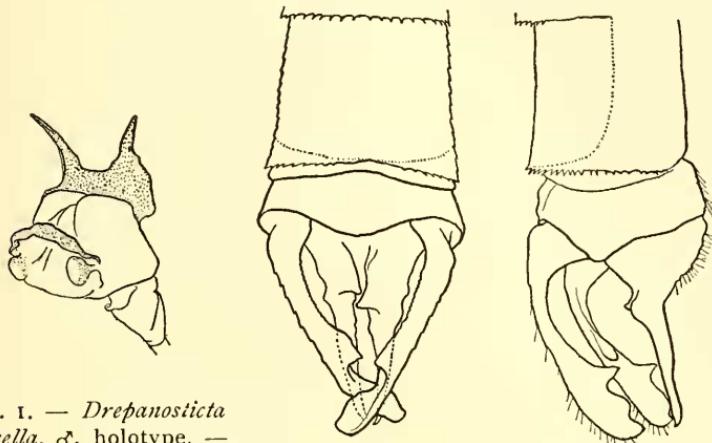


Fig. 1. — *Drepanosticta gazella*, ♂, holotype. — Prothorax, frontal view.

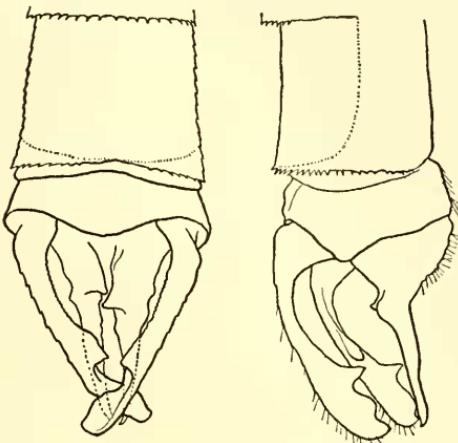


Fig. 2. — *Drepanosticta gazella*, ♂, holotype. — Appendages, dorsal view and right side.

and *Ac* in the front wing about equal in length. Postnodal index $\frac{15.15}{14.14}$. Pterostigma reddish brown, heavily framed in black (Fig. 3). Length: abd. + app. 32, hw. < 21 mm. ¹⁾

♀ adult. — Colouring as in the male, but segm. 9 of the abdomen not entirely blue above: here the colour is restricted to its distal half. Posterior lobe of the prothorax as in the male, but the black lateral horns are a trace shorter and rounded at the end. ²⁾

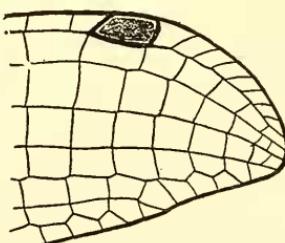


Fig. 3. — *Drepanosticta gazella*, ♂, holotype. — Tip of hind wing.

¹⁾ Smallest specimen: 30, 19.5 mm.

²⁾ In this respect 6 female specimens, now before me, are peculiar in having only very short, almost budlike horns at the posterior lobe of the prothorax, while in one specimen, the horns are unequal in length. Under the microscope these short protuberances do not appear to have been broken off accidentally, so that I am inclined not to ascribe a function of much importance to these horns during the act of copulation. The function of the same organs in the male sex — if existing at all! — is rather obscure.

Valves very long; in profile view the ventral margin almost straight, surpassing the end of segm. 10 for about 1 mm. Length: abd. (including the valves) 30, hw. > 22 mm.

Drepanosticta spatulifera sp. nov. (figs. 4—6).

5 ♂, 2 ♀, Java occ., res. Banjoemas, Batoerraden, G. Slamat, 2500 ft., leg. F. C. DRESCHER. Dates: 2. XII. 1927; 15. IV., 1. IX., 15 and 21—22. X. 1928. — Holotype ♂ and Allotype ♀ 15. IV. 1928. — Coll. m.

♂ adult. — Labium dark brown. Base of mandibles, anteclypeus and labrum ivory-white, the latter separated from the anteclypeus by a fine black suture and broadly bordered with black. Rest of the head glossy black. Eyes dark brown. Prothorax flesh-coloured, as in the foregoing species; anterior lobe black. Posterior lobe well developed, broad, deep

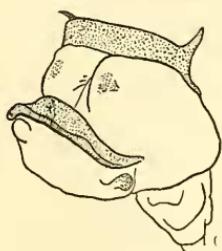


Fig. 4. — *Drepanosticta spatulifera*, ♂, holotype. Prothorax, frontal view.

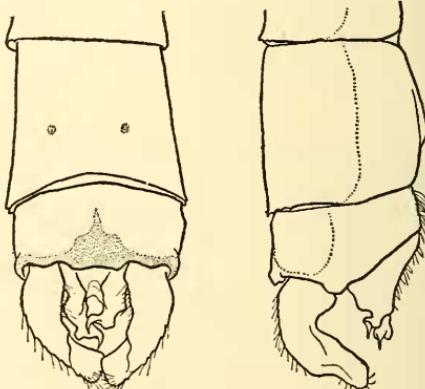


Fig. 5. — *Drepanosticta spatulifera*, ♂, holotype. — Appendages, dorsal view and right side.

black, at each outer angle furnished with an extremely thin and flattened process, which is much smaller than in *gazella*; seen from above these narrow organs are widely separated from each other (fig. 4).

Synthorax wholly black, strikingly lackered in appearance, without any indication of light markings wherever, but with a bronze metallic shine. Legs, including coxae, pale orange; femora with pale brown longitudinal streaks on the outer sides and dark knees. Abdomen brownish black, with small yellowish brown rings on segm. 3—7 at their bases. Segm. 8

with a brownish spot at the sides. Dorsum of segm. 8 for its distal $\frac{2}{3}$ part sky-blue, like as segm. 9 and 10. Appendages black (fig. 5). Wings hyaline. The nervure *Ab* in the front wing about twice as long as *Ac*. Postnodal index $\frac{17.17}{17.16}$.

Pterostigma very dark brown, heavily framed in black (fig. 6).

Length: abd. + app. 29, hw. 20.5 mm.

♀ adult. — Mandibles, anteclypeus and labrum whitish, the latter diffusely bordered with brown; there is no dark suture between anteclypeus and labrum. Eyes dark brown. Prothorax, with the exception of anterior and posterior lobes, whitish, the latter without hornlike processes. Synthorax as in the male. Abdominal segments 1—7 as in the male. Dorsum of segm. 8 yellowish brown (perhaps blue in life?).

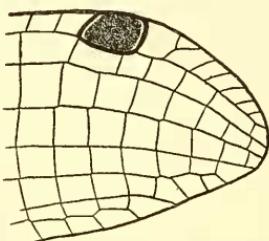
Fig. 6. — *Drepanosticta spatulifera*, ♂, holotype.
Tip of hind wing.

Segm. 9 and 10 black. Valves much shorter than in *gazella*; in profile view the ventral margin convex, not surpassing the end of segm. 10.

Length: abd. 26, hw. 20 mm.

I hope to discuss at some other place the systematic position of *D. krügeri*, described by LAIDLAW ("Spolia Mentawiensis", *Journ. Mal. Br. Royal Asiatic Soc.*, IV, 2, Oct. 1926, pp. 228—229 (figs. 2a—c) from the islands to the west of Sumatra and more recently also from Benkoelen (Sumatra) by Dr. RIS (*Zool. Mededeelingen*, Leiden, X, 1927, pp. 19—20, fig. 10).

There is no doubt this species being at any rate very closely related to the handsome Javanese *sundana* KRÜGER, of which I have received excellently preserved material from several localities on the western part of the island (F. C. DRESCHER leg.). In order to facilitate the determination of the four Javanese species, a figure of the male abdominal appendages and a second of the prothoracic horns may be still useful (cf. also RIS' figures in *Tijdschr. v. Entom.*, 55, 1912, pl. 7, fig. 2).



They may be separated as follows:

M a l e s.

1. Mesepimerum of the synthorax entirely black. On either side of the posterior lobe of the prothorax an extremely thin and very short process, black in colour (fig. 4). Abdominal segments 8—10 for the greater part blue. Anal appendages black (fig. 5). Abd. 29, hw. 20.5 mm. *spatulifera*, sp. n.
- Mesepimerum of the synthorax at least spotted or with a light fascia 2
2. On either side of the posterior lobe of the prothorax a club-shaped process, pale brown in colour, directed almost vertically upwards, bearing at the top a row of



Fig. 7. — *Drepaposticta sundana* KRÜGER, ♂.
Java, Batoerraden. —
Prothorax, frontal view.

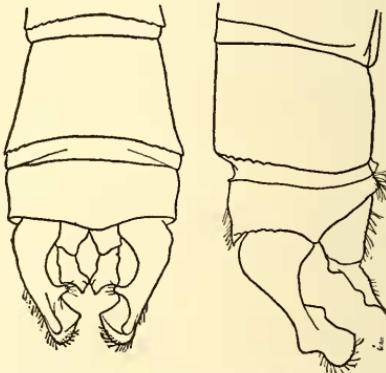


Fig. 8. — *Drepaposticta sundana* KRÜGER, ♂. Java, isl. Noesa Kambangan. —
Appendages, dorsal view and right side.

- fine hairs of the same colour (fig. 7). Abdominal segments 9—10 black. Anal appendages black, with brown tips (fig. 8). Abd. 42, hw. 26 mm. Largest species *sundana* KRÜG.
- On either side of the posterior lobe of the prothorax a pointed process, black in colour, without fine hairs at the end 3
3. Posterior lobe of the prothorax with an outwardly curved, hook-like horn at each outer angle. Synthorax marked laterally with an elongate narrow pale bluish spot at the anterior border of the hind suture. Abdominal segment 9 black (?). Anal appendages dirty white.

Ceriagrion praetermissum sp. nov. (fig. 9).

1 ♂ and 1 ♀, Java, M. C. PIEPERS leg.

♂ ad. (Holotype). — Face uniformly pale yellowish brown; vertex and epicranium likewise, but with a distinct brownish olive tinge; occiput a trace lighter and tegulae whitish. Eyes globular, dark greenish brown. Prothorax and synthorax uniformly cinnamon-coloured, fading to rusty brown above and gradually turning to almost white underneath, without any dark sutures, except a mere trace of a brownish line along the dorsal end of humeral and second lateral sutures. Wings hyaline, without yellow huge; neuration rusty yellow. Pterostigma trapezoidal, in hind wings a trace longer than in front wings, light yellowish grey.

Ab rises at level of *Ac* in the front wings, distinctly behind *Ac* in the hind ones. *Ac* situated exactly in the middle

¹⁾ This species was recently described by FRASER (*Treubia*, Buitenzorg, 1926, vol. VIII, pp. 490-491) from Mt. Tengger, 5000 ft., Java. The above mentioned characters are taken from the original description. I have not seen the species. FRASER gives a figure of the remarkable prothoracic organs of the male, but only a description of the anal appendages, no figure. —

As to this *D. siebersi* FRAS., Mr. DRESCHER gave me in a letter ddo. 4. II. 1929, the following informations: "In the Buitenzorg Museum I have seen the remnants of the types of *D. siebersi* in 2 envelopes, in order to compare them with the two other new *Drepanosticta*'s, to be described in your paper, but the specimens are in a very bad condition, even so bad that they are not recognizable".

of the level of the two antenodal nervures. Postnodal index: $\frac{9.9}{8.8}$ only. — Abdomen pale orange throughout, dorsum of terminal segments scarcely a little darkened (very probably due to postmortal fading). Appendages of the same colour, main stem of the inferiors darkened at its extreme tip. Each

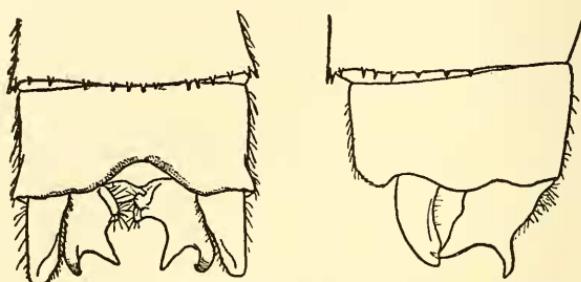


Fig. 9. — *Ceriagrion praetermissum*, ♂, holotype. — Appendages, dorsal view and right side.

of the inferior appendages bears a strong pointed off-shoot, directed backward and inward (fig. 9).

Length: abd. + app. 23.5, hw. 15 mm.

♀ semiad. (Allotype). — Head as in the male. Colour of dorsum of synthorax paler than in the other sex. Sides and ventral surface pale greyish white, like as the coxae and legs. Wings hyaline, neuration greyish brown. Pterostigma a trace higher than in the male, of the same colour.

Ab rises at level of *Ac* in all wings. *Ac* situated rather more proximally than is the case in the male. Postnodal

index: $\frac{10.10}{8.8}$. —

Abdomen dull yellowish orange, with very narrow brownish terminal rings on each segment. Valves long and narrow, gradually diminishing from base to apex, and surpassing end of segm. 10 considerably; ventral margin not distinctly convex, as usual, but almost *straight*.

Length: abd. 24.5, hw. 16.8 mm.

The types will be returned to the Leiden Museum.

This very small species, being in fact the smallest member of the genus, attracted my particular attention on account of the very peculiar shape of the inferior anal appendages

of the male, and by its short wings. In general appearance a true *Ceriagrion*; the legs are characteristic and a transverse ridge across the frons is well-developed. In addition to this new *Ceriagrion* it may be noted that RIS, in this volume, 55, 1912, p. 160, discussed a single female of an equally small species, measuring only 22 and 15 mm., and captured near Djokjakarta, E. Java (E. JACOBSON). This specimen was referred to *C. erubescens* with much doubt. Though I have not examined it, I am strongly inclined to think that it must be reckoned to *praetermissum*, described above. The very large and quite homogeneous form of what I would presumably call "*erubescens*" SELYS, also inhabiting Java, is well-known to me and appears to be widely distributed all over the island. There is, besides, a *third* somewhat smaller species on Java, which is quite distinct from both "*erubescens*" and *praetermissum*. This latter species stands somewhat apart from the other Malayan members of the genus, which certainly will prove to be very numerous. Before long I hope to deal with them in a special revisional paper.¹⁾

***Aciagrion aciculare*, sp. nov. (figs. 10—11).**

2 ♂, 1 ♀, Java, Batavia, X. 1907, leg. EDW. JACOBSON; 1 ♂ ad., idem, XI. 1907 (Holotype).

♂ ad. (Holotype). — Labium and genae whitish. The following parts of the head are azure blue: labrum, base of mandibles, whole clypeus, first two joints of antennae, frons, and epicranium to a level just behind the median ocellus. Vertex with two black spots between the lateral ocelli and a brownish black band joining the lateral ocellus with the inner margin of the compound eye on either side; with a pair of very large subtriangular (or drop-like) postocular

¹⁾ Quite fortunately and just in time, I came across a paper on N.E.-African Odonata (Dr. F. RIS, Wiss. Ergebn. der Zool. Exped. nach dem Anglo-Aegyptischen Sudan, in *Denkschr. Akad. Wissensch., Wien*, 99, 1924). In this paper RIS describes a small new *Ceriagrion cordofanicum* from Tonga, which apparently has much likeness with my *praetermissum* from Java, especially with respect to the shape of the appendages (p. 279, fig. 4, lateral view). Apart from the widely different habitat, a discrimination of the two species, however, seems quite possible. Later on I hope to come back on this subject.

spots of blue, united across the occiput by a narrow band of the same colour. Posteriorly each of these spots is largely bordered with a band of a warm brown colour. Orbites very light bluish white. Anterior part of prothorax blue above, posterior part greenish blue, with brown markings. Dorsum of synthorax banded with brown and blue as follows: Median longitudinal carina light brown, on each side bordered with a brown line of about half the breadth, then broad and straight, blue antehumeral bands, bordered with a fine brown line along the upper half of the humeral suture. Sides entirely blue, fading to pale bluish white on the metepimerum, unmarked, save for a short brown line at the top of the second lateral suture. Ventral surface and coxae whitish. Legs whitish; distal $\frac{2}{3}$ of exterior sides of femora, with a brownish line and a dark spot at the knees. Tarsi white; spines black. Hindmost femora with a row of 5—6 spines, exteriorly. — Reticulation of wings yellowish brown; membrane hyaline. Pterostigma dark greyish, in front wings distinctly larger than in hind wings. Postnodal index $\frac{10.10}{9.9}$.

Viewed laterally, the *penis* is chiefly characterized in having the apex of the third segment broadly truncate and not

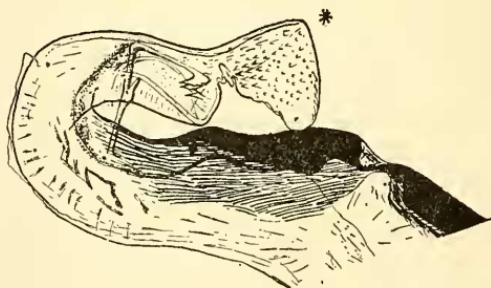


Fig. 10. — *Aciagrion aciculare*, ♂, paratype. —
Lateral view of the penis.

cornuate as in *occidentale* and *borneense*. At the point of cessation of the median ventral line (indicated in the figure by an asterisk), the apex is strongly bent upward to form, on either side, a large rounded end-lobe, each of which is closely beset with fine shagreenlike denticles interiorly, progressively smaller from base to apex. It differs from that of

hisopa and *pallidum* in having the pair of internal spines, close to the "elbow-joint" only very small; like as in *pallidum* the most basally situated denticles (4 in number) are much enlarged and project backward like barbs, between the two large, lateral marginal lobes¹), which are not at all thin and conspicuous spurs (as is the case in *hisopa* and *pallidum*), but very blunt and rounded lobes (fig. 10)².

Abdomen long and very slender. Ground-colour of segm. 1—3 and 8—10 blue; sides of segm. 3 gradually passing into greenish yellow; remaining segments yellow laterally. Segm. 1 with a square black marking, occupying the whole dorsum. Dorsum of segm. 3—7 black or dark brown; markings rather constricted before the end of each segment, so that the extreme base of each is surrounded by a very narrow white ring. Seen from above the blue colouring on segm. 1—2 and basal portion of 3 is clearly visible; more distally the dark colour gradually enlarges. Segm. 8—10 wholly blue. Superior anal appendages and upper part of inferiors darkened; lower part of the latter yellowish (fig. 11).

Length: abd. + app. 27.5, hw. 16.5 mm.

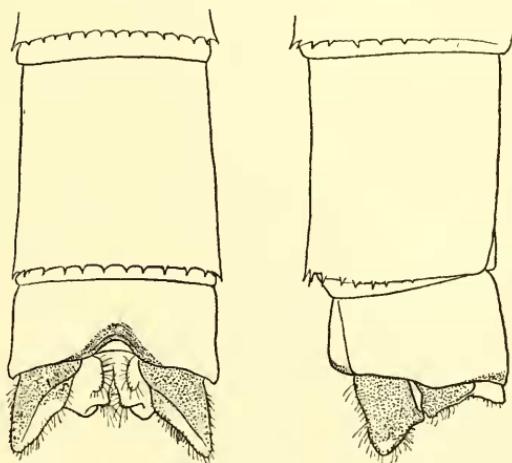


Fig. 11. — *Aciagrion aciculare*, ♂, holotype. — Appendages, dorsal view and right side.

¹) The denticles seem to be entirely absent in *hisopa* (cf. LAIDLAW, 1924, fig. 8, pl. 1).

²) The structure of the penis has been examined and drawn from the immature paratype specimen only.

♂ (juv.). — This rather immature specimen is peculiar for its colouring. All light parts of the head and thorax, except the postocular spots and the antehumerales, which are already blue, are of a delicate, soft fawn colour and the adjacent brown fasciae of the adult insect are warm brown. Ground-colour of abdomen paler (segm. 1—3 very light blue laterally), and the dorsal dark markings are reddish brown, especially on the basal segments. Terminal three segments of indefinite colour, unmarked. Wings with postnodal index:

$\frac{11.11}{9.9}$. Length: 28,17 mm.

♂ (ad.). — Almost identical with the type specimen. Only the *vertex* is wholly black and the size is larger. Postnodals:

$\frac{12.12}{10.10}$. Length: 27.5, > 18 mm.

♀ ad. (Allotype). — Very similar to the male, but differing in the following respects. Labrum bluish, with indefinite brownish spots, distal margin largely yellow. Colour-scheme of thorax similar to the male. Posterior border of prothorax slightly, but distinctly elevated, rounded and with a black streak at its base. Pterostigma pale. Postnodal index: $\frac{11.11}{10.10}$.

Sides of abd.-segm. 1—3 blue, as in the male. Dorsal markings brown and only very slightly constricted before the end of each. Segm. 8—10 pale, apparently somewhat discoloured, but very probably also blue in life, marked with black as in ♀ *hisopa* SELYS: longitudinal black fascia on the dorsum of 8 not reaching the apex and small, paired black basal spots on 9. Segm. 10 blue, its posterior border nearly straight, but deeply indented in the middle. Appendages short, conical, darkened above.

Length: abd. 28, hw. 18.5 mm.

Types in Mus. Leiden, paratypes in coll. m.

This new species may be placed in LAIDLAW's table under group α^1 (species with much blue colouring on head, thorax and abdomen), though it may prove to be more closely related to *A. pallidum* SELYS. (See F. F. LAIDLAW, "Notes

on oriental dragonflies of the genus *Aciagrion*", *Proc. U. S. Nat. Mus.*, 66, 1924, figs. 1-16).

It is the first representative of the genus reported from the island.

***Heliogomphus drescheri*, sp. n.** (figs. 12-13).

14 ♂, 20 ♀, Java occ., res. Banjoemas, Batoerraden, G. Slamat, 2500 ft., leg. F. C. DRESCHER. Dates: 27. V., X and 20. XI. 1927. — 2. V; 3, 11, 12, VI; 27, 28, 29. VII; 6, 11. IX; 15, 19-20 and 22. X. 1928. — Holotype ♂ and Allotype ♀ 27 and 28. VII. 1928. — Many specimens very teneral.

♂ ad. (Holotype). — Head largely black, shining, spotted with yellow. Labium, base of mandibles, genae and two large triangular spots on the labrum yellow. Anteclypeus black, postclypeus with two minute spots on either side and a greenish yellow band across the frons. Occiput black. Prothorax black, its anterior lobe, a spot at the sides and two points in the centre on the pronotum greenish. Synthorax, dorsum black, mesothoracic collar dull green, narrowly interrupted in the middle line; joined on either side by the anterior end of the dorsal bands, which form with the collar 7-shaped marks; these marks pointed at their upper ends near the antealar sinus. Near the upper end and to the outer side of each, lies a rounded spot (vestige of the ante-humeral band). Epimerum of the mesothorax with an olive-green fascia along the humeral suture; for the rest black (fig. 12). Sides of the metathorax olive-green. Ventral surface and coxae yellowish green, pruinose. Legs black.

Abdomen extremely slender, segm. 1-2 moderately, 8-10 strongly inflated. Ground-colour shining black. First segment yellowish green, like as the auricles and the sides of segm. 2. Very small basal marks of orange on the sides of segm. 3-5; complete basal annules encompassing the segm. 6-7, occupying about $1/8$ and $1/5$ of the segment, respectively. There is a fine yellow longitudinal line on the dorsum of segm. 2-5, conspicuous only on segm. 2 and 3. Segm. 8-10 entirely black. Anal appendages black, the upper ones shading to pale yellow apically. App. sup. lyrate, (as is quite typical for the genus), each with a very conspicuous extero-lateral

projection at the point at which they begin to curve inward, whilst the tiny apices are curved upward. Lower appendage with widely divaricated branches, just of about the same breadth as the upper, and of about half the length of it (fig. 13).

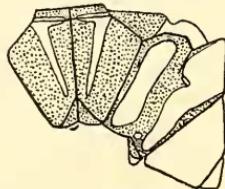


Fig. 12. — *Heliogomphus drescheri*, ♂, holotype. —
Synthorax. See p. 147!

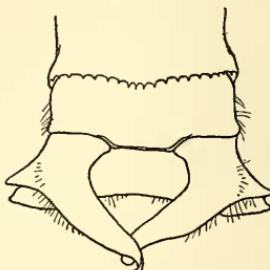


Fig. 13. — *Heliogomphus drescheri*, ♂, holotype. — Appendages, dorsal view.

Wings entirely hyaline. Triangles, supra-triangles and sub-triangles free. Forewing with a single row of cells between Cu_2 and the anal angle of the wing. Hind wing — at level of the triangle — with 2×3 rows of cells between Cu_2 and the anal angle, then with 2 rows of cells. $Cux \frac{2.2}{1.1}$.¹⁾

Nodal index $\frac{13.15}{12.12} \mid \frac{14.13}{11.13}$. M_4 and Cu_1 not running parallel as far as the level of the nodus in the front wing: up to the nodus with two rows of cells, more distally with three or more rows. Anal triangle with two oblique cross nerves. Pterostigma black. Length: abd. + app. 30, hw. 25, pt. 2 mm.

♀ ad. (Allotype). — Very similar to the male. Epicranium and occiput simple, but with two very diffuse greenish spots close to the hind margin, just behind the two posterior ocelli. Coxae and ventral side of thorax with bluish pruinescence. Yellowish spots on the abdominal segments more conspicuous than in the male. Sides of segm. 2—4 with a light longitudinal fascia, broken into two pieces on segm. 3

¹⁾ In the hind wing the number of cross veins between Cu_2 and the anal wing border is somewhat variable, like as the number of cubital cross veins. I have before me a female with only two rows of cells in the anal field (except, of course, at the extreme base). The number of cubital nerves varies between $\frac{2.2}{1.1}$ and $\frac{2.2}{2.2}$.

and 4. Wings palely saffronated at the base. Venation as in the male. $C_{ux} \frac{2.2}{2.2}$. Nodal index $\frac{12.15}{13.11} \frac{15.11}{11.13}$. Pterostigma dark brown. Length: abd. 31, hw. 24, pt. 2.5 mm.

I have much pleasure in dedicating this elegant little species to Mr. F. C. DRESCHER, eminent entomologist, who spared neither labour nor expense to discover the favourable hunting places of Javan dragonflies. Many interesting additions to the fauna of Java are due to him.

According to Mr. DRESCHER himself, this jungle-loving insect seems to be by no means common, and especially adult specimens are very scarcely seen on the wing. It was repeatedly taken together with *Leptogomphus lansbergei* SELYS.

The only species which seems to have very close affinities to the present one, is *H. gracilis* KRÜGER, from Sumatra (Deli and the Padangsche Bovenlanden). In a recent paper (*Zoöl. Meded.*, Leiden, X, 1927), RIS gives a description and good figures of a male from Tanangtaloe (Pad. Bovenl.), which agrees in many respects with the Javanese species, especially in the colour-pattern of the body. As, however, the very peculiar shape of the superior anal appendages of the male of *drescheri* is a constant feature for this species, I do not hesitate to give it a name. The question whether *gracilis* and *drescheri* should be considered as representing geographical subspecies, is one I cannot yet answer, because the female of *gracilis* is only known from a very immature example; moreover I have not had the opportunity of studying the Sumatran species.

***Heliogomphus blandulus* sp. nov. (figs. 14—16).**

1 ♂ Equat. Borneo, basin of Kapoeas River, "Sumpfwald am Bika Fluss", 4. II. 1925, leg. Prof. Dr. H. WINKLER. — Holotype ♂ Mus. Hamburg.

♂ Adult. — All parts of the mouth, clypeus and occiput in its posterior half dull olive-green, without any trace of black markings. Vertex dark blackish brown. Pronotum entirely black. Synthorax, dorsum black, mesothoracic collar narrow, olive-green, interrupted in the middle line; humeral

bands narrow, straight, not broadened in front and completely isolated. Sides entirely olive-green, without traces of black sutures (fig. 14). Underside yellowish green, distinctly pruinose. Legs black, the hind femora dull yellowish brown, hind tibiae dark brown. Abdomen very slender, segments 1—2 and 8—10 moderately inflated. Ground-colour black, rather shining.

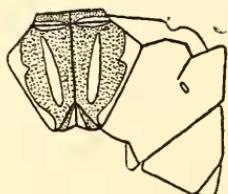


Fig. 14. — *Heliogomphus blandulus*, ♂, holotype.
— Synthorax.

First segment olive-green, like as the auricles and the sides of segm. 2 and 3, anteriorly. Genitalia not prominent, typical (fig. 15). Small and diffuse basal marks of orange on the sides of segm. 4—6, occupying about $1/5$ of the length; complete basal annule encircling the segm. 7 and an elongated pale yellowish spot on the sides of segm. 8. There is

an extremely fine yellow longitudinal line on the dorsum of segm. 2—7.

Remaining segments black. Anal appendages black, the upper ones diffusely yellowish at their apices. App. sup. lyrate,



Fig. 15. — *Heliogomphus blandulus*, ♂, holotype.
— Genitalia, second seg-
ment, left side view.

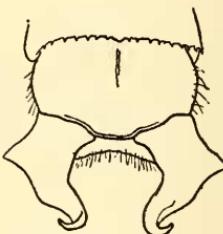


Fig. 16. — *Heliogomphus blandulus*, ♂, holotype,
— Appendages, dorsal
view.

with a distinct and pointed extero-lateral projection at the point at which they begin to curve inward; the tips are strongly curved upward. Lower appendage with widely divaricated branches, which are just covered by the lateral projections of the upper ones (fig. 16).

Wings entirely hyaline, but with iridescence all over.

Neuration close, exactly as in the foregoing species. *Cux*

$$\frac{1.1}{1.1}.$$
 Nodal index $\frac{9.13}{9.10} \frac{12.10}{9.10}$. Pterostigma brown.

Length: abd. + app. 27, hw. 23.5, pt. 2 mm.

The actual species is one of the smallest — if not the very smallest — of all known *Heliogomphus*, and accordingly in general appearance shows a close resemblance to members of the genus *Microgomphus*. The species is remarkable for the total absence of black markings at the sides of the synthorax and particularly interesting for its highly cryptic olive-green coloration. Very probably a shade- or jungle-loving creature. It is the first representative of the genus in Borneo.

Microgomphus thelyphonus, sp. nov. (figs. 17—20).¹⁾

2 ♂, 1 ♀ ad., Java mer. (FRUHSTORFER), in DE SELYS' collection, Mus. Brussels. One of the males bears a pin-label in SELYS' handwriting: "*Microg. race de chelifer, à étudier*". The other specimens are labelled by DE SELYS: "*Microgomphus Fruhstorferi* S."

♂ ad. (Holotype). — Head black, spotted with dull yellowish as follows: Labium, base of mandibles and two spots on either side on the labrum; a triangular spot in the middle of the anteclypeus and 2 + 2 spots on either side on the terminal lobes of the postclypeus; a greenish band across the frons, narrowly interrupted in the middle. Vertex and occiput black. Prothorax black, its anterior lobe with a broad citron-yellow band roundabout. Synthorax, dorsum black, mesothoracic collar citron-yellow with distinct greenish shade, scarcely interrupted in the middle line; joined on either side by the anterior end of the dorsal bands, which form with the collar $\swarrow\searrow$ -shaped marks, and are pointed at their upper ends near the antealar sinus. Sides with two very broad and conspicuous light bands of a very striking orange colour, the anterior one for the greater part occupying the mesepimerum and partly, the metepisternum, the hindmost occupying nearly the whole metepimerum (fig. 17). Ventral surface

¹⁾ *thelyphonus* = *Thelyphonus caudatus* L., the Javanese "goenting". — (pedipalpus).

largely black, pruinose. Coxae yellow, striped with black. Legs entirely black.

Abdomen slender, segm. 1-2 and 8-10 moderately inflated. Ground-colour black. First segment black, with a broad basal band including the auricles, dull olive-green; apart from this, a large irregular lateral spot near the apical border of the segment. Segm. 3 and 7 black, with two minute yellowish spots on the dorsum, at base. Remaining segments

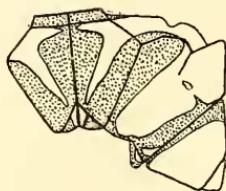


Fig. 17. — *Microgomphus thelyphonus*, ♂, holotype.
Synthorax.

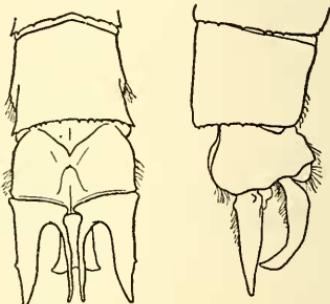


Fig. 18. — *Microgomphus thelyphonus*, ♂, holotype. — Appendages, dorsal view and right side.

and appendages entirely black. Anal appendages chelate. The outer branches of the superior ones running exactly parallel to one another; inner branches at first converging, then parallel, very closely approximated to each other. Lower appendage reaching somewhat more than half the length of the superior ones (fig. 18). The vesicle of the penis is exactly similar to the same organ in *chelifer*, but, unfortunately enough, the true penis is not visible.

Wings hyaline, hardly tinged with yellow at base. Neurulation similar in almost every respect to that of *chelifer*. Pterostigma distinctly longer, sepia brown.

Length: abd. + app. 29, hw. 23.5, pt. 2.5 mm.

♂ (Paratype). — The second male, very probably taken on the same locality and together with the type specimen, only differs from it by its smaller size (abd. + app. 27.5, hw. 22, pt. 2.5 mm.).

♀ (Allotype). — Very similar to the male. The two spots on either side on the labrum confluent in the middle line. The free margin of the occipital plate, in frontal view, with

a low but sharply crested elevation, directed upward under a right angle; this margin slightly concave in the middle, with a row of 5—6 robust, irregular black spines on either side; anterior surface with a low, central tubercle, just behind the two posterior ocelli (fig. 19).

Light parts of synthorax and abdomen of the same remarkable orange colour as in the male; there are, however, no greenish shades. Near the upper end and to the inner side of the second lateral suture a small isolated spot of orange, which is absent in the male.

Ventral side pruinose. Abdomen black, with orange spots. First segment black, sides yellow. The broad basal band

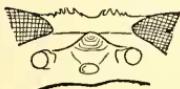


Fig. 19. — *Microgomphus thelyphonus*, ♀, allotype. — Vertex and occiput, frontal view.

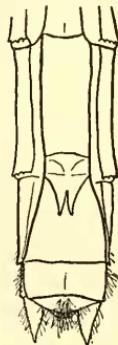


Fig. 20. — *Microgomphus thelyphonus*, ♀, allotype. — Terminal segments, ventral view.

on segm. 2 largely confluent with the lateral spot on either side, so that only the terminal $\frac{2}{3}$ of the segment remains black dorsally. Dorso-lateral spots at base of segm. 3 somewhat larger than in the male, each of them devided into two small fasciae, one after another. Segm. 4—7 with very small paired dorsal spots, at the base of each segment. Remaining segments and appendages black. Ventral side of abdomen black. Vulvar scale see fig. 20. — Wings hyaline. Pterostigma light sepia-brown.

Length: abd. + app. 28, hw. 25, pt. 3 mm.

The occurrence of a true *Microgomphus* on Java means a very interesting addition to the known dragonfly-fauna of this island. I am convinced, that the above described species is a good one, though there are many points of resemblance

between this and *chelifer* DE SELYS, from which I have been able to examine the type. The mutual relationship will be discussed below.

Microgomphus chelifer DE SELYS 1857 (fig. 21).

Microgomphus chelifer ♂ Selys (*Mon. des Gomphines*, 1857, pp. 100—102, Pl. 6, fig. 3). — Coll. Selys. — Hab.: Malacca (Mt. Ophir).

„ „ ♂ Selys (*Add. au Synopsis des Gomphines*, 1859, pp. 7—8). — Same specimen.

„ „ ♂ Krüger (*Stett. entom. Zeitung*, 59, 1898, p. 302). — Hab.: Sumatra (Soekaranda).

„ „ ♂♀ Williamson (*Proc. U. S. Nat. Mus.*, 33, 1907, pp. 295—296, figs. 21—22). — Short description and wing-photographs of holotype and allotype in de Selys' collection. No description of the female.

„ „ ♂ Laidlaw (*Proc. Zool. Soc. London*, 1914, pp. 51—63). — Hab.: Borneo (Saribas).

„ „ ♂ Laidlaw (*Idem*, 1920, p. 317). — Record of same specimen.

„ „ ♂ Laidlaw (*Rec. Ind. Mus.*, Calcutta, 24, 1922, pp. 380—383). — General discussion of genus.

On a recent visit to the Brussels Museum the kindness of M. ANTOINE BALL enabled me to study a number of types in DE SELYS' collection. Among them I found the holotype male of *Microgomphus chelifer* SELYS, which species was already so very well described and figured by DE SELYS and HAGEN in the "*Monographie des Gomphines*", some seventy years ago. In 1907 WILLIAMSON gave a wing photograph of the type specimen and another of the female, but — up to now — I did not realize the female of this species having not yet been described at all. Anyhow, I missed the opportunity to study the female more thoroughly,

although I am convinced that the three present female specimens are conspecific with the holotype male. WILLIAMSON (loc. cit.) says nothing about the localities whence the three females came; these are all labelled: "Bornéo, W. K." and one of them, added to this, bore the name of the collector: "CLÉM(ent)". Two of them are very young and the only adult specimen lacks its abdominal segments 8—10. It would be of great interest now to examine a good female and, especially, to compare the external genital organs of the abdomen and the thoracic colour-pattern with those of the closely allied *M. thelyphonus*, described above.

Having now before me the holotype male of DE SELYS, I think necessary to offer the following alterations and additions to the existing description.

Holotype ♂ DE SELYS. — Adult.

Length: abd. + app. 24 (SELYS: $26\frac{3}{4}$), hw. $18\frac{1}{2}$ (SELYS: $18\frac{1}{2}$), pt. 2 (SELYS: 2 mm.).

The black stripe on the lateral sides of the synthorax small, narrow, and pointed ventrally, not reaching the ventral margin of the second lateral suture, ending just before the niveau of the stigma. (SELYS: "les côtés du thorax avec une seule bande noirâtre, appuyée sur la suture médiane, un peu plus large par en haut, s'effaçant tout-à-fait par en bas"). — See fig. 21. — Legs entirely black (SELYS: "Pieds brun noirâtres.... etc."). The figures of the anal appendages, drawn by H. A. HAGEN, are very good; it may be useful to accentuate the following: 1°. the outer branches of the superior ones not running parallel, but somewhat diverging to each other, 2°. space between the two inner branches exactly as wide as that between the outer and inner branch on either side.¹⁾

In the male sex the two related species of *Microgomphus*, viz *chelifer* and *thelyphonus*, can be separated as follows:

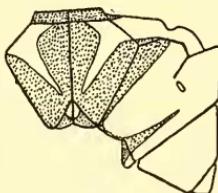


Fig. 21. — *Microgomphus chelifer* SELYS, ♂, holotype. — Synthorax.

¹⁾ Under the microscope, this fact appears not to be due to decomposition of the appendages.

M. chelifer.

Insect of small size : abd. + app. 24, hw. $18\frac{1}{2}$, pt. $\angle 2$.
 Colour of synthorax dull olive-green.
 Black stripe on sides of synthorax much reduced.
 A fine longitudinal yellow line on dorsum of segm. 3—8.
 Small paired basal spots on dorsum of segm. 4—6.
 Anal appendages dark reddish brown.
 Outer branches of superior apps. not parallel to each other, somewhat diverging.
 Space between inner branches of sup. apps. as wide as the space between outer and inner branch on either side.
 Appendix inferior reaching half the length of the superiors.
 Habitat: Malacca, Sumatra, Borneo.

M. thelyphonus.

Insect of larger size : abd. + app. 29, hw. $23\frac{1}{2}$, pt. $2\frac{1}{2}$.
 Colour of synthorax, especially on the sides, bright orange.
 Black stripe on sides of synthorax broad, extending roundabout thorax.
 Longitudinal yellow line on dorsum of segm. 3—8 absent.
 Abdominal segments 4—6 wholly black.
 Anal appendages black.
 Outer branches of superior apps. parallel to each other.
 Space between inner branches of sup. apps. only $\frac{1}{5}$ or $\frac{1}{6}$ of that between outer and inner branch on either side.
 Appendix inferior reaching somewhat more than half the length of the superiors.
 Habitat: Java.

***Burmagomphus inscriptus* DE SELYS 1878 (fig. 22).**

Onychogomphus? inscriptus ♀ Selys (4^e Add. au Synopsis des Gomphines, 1878, pp. 17—18).
 Mus. Leiden. — Hab.: Java.

Burmagomphus jacobsoni ♂ Ris (*Tijdschr. v. Entom.*, 55, 1912, pp. 162—164, pl. 6, fig. 8, pl. 7, fig. 5—7). — Mus. Leiden and coll. Ris. — Hab.: Java. (Samarang).

Thanks to the presence in the Museum collection of Leiden, of one of the two specimens on which RIS (loc. cit.) based the description of his *Burmagomphus jacobsoni*, I am now able to establish the identity of this species with the insect

of DE SELYS, which has been a puzzle for many years to every odonatologist. This is not astonishing, as DE SELYS placed his female provisionally in the genus *Onychogomphus*, in expectation of the male, which was unknown to him. Moreover DE SELYS' account on the neuration of his insect is very insufficient and gives no decisive answer upon the generic position of it. Thus, it is not at all surprising, that RIS considered the male as a new species. Nevertheless I am happy to be able to give DE SELYS his own.

To the ample description of the female type specimen, I have but little to add.¹⁾ The specimen seems quite matured and agrees in almost every respect with the paratype male *jacobsoni*, also before me at this moment. The length of the hind wing is not 32, as stated by DE SELYS, but 30 mm. Pterostigma braced in all four wings. Discoidal field in the front wing, up to the nodus, with two rows of cells, more distally with three and more, as in the male. In both hind wings only 1 cell is present between the sectors of arculus, proximal to the forking of M_{1-2} and M_3 . Basal antenodal of second series present. Nodal index:

9.14 | 13.9
9.10 | 10.8. Colour of the entire body very much alike the paratype male *jacobsoni*, the yellowish annules on the abdominal segments more definite and somewhat larger. Synthorax with a small yellow fascia on the metepisternum, as is present in RIS' type specimen (cf. RIS' figure of the thorax, pl. 7, fig. 5).

Abdominal segments 7—8 somewhat flattened dorso-ventrally, less in lateral direction. Segm. 10 very short (fig. 22). — Holotype ♀ and homoiotype ♂ in Mus. Leiden; paratype ♂ in coll. Dr. F. RIS.

***Onychogomphus geometricus* DE SELYS 1854 (figs. 23—24).**

Onychogomphus geometricus Selys ♀ (*Synopsis des Gomphines*, 1854, p. 12). Holotype, Mus. Leiden. — Hab.: Java.



Fig. 22. — *Burmagomphus inscriptus* SELYS, ♀, holotype. — Terminal segments, ventral view.

¹⁾ This specimen bears a pin-label "Java. K. & v. H."

Onychogomphus geometricus Selys ♂♀ (*Monogr. des Gomphines*, 1857, pp. 20—22, pl. 1, fig. 1). Allotype ♂ Mus. Brussels, paratype ♂ Mus. Leiden. — Hab.: Java. Selys ♂ (*2e Add. au Synopsis des Gomphines*, 1869, pp. 9—10). — Allotype redescribed. Williamson (*Proc. U.S. Nat. Mus.*, 33, 1907, p. 309 & 311). — Key. Laidlaw (*Rec. Ind. Mus.*, Calcutta 24, 1922, p. 406). — Key.

Material studied: 1 ♂ ad., Java, K. & v. H. (paratype), 1 ♀ ad., Java, K. & v. H. (holotype); 2 ♀ damaged, Java; 1 ♂ Java, ex STAUDINGER; all Mus. Leiden. — 1 ♂, 1 ♀ ad. Java (in the handwriting of H. ALBARDA), Mus. Amsterdam. — 1 ♂ ad. E. Java, Samarang, E. JACOBSON leg. Coll. m.

A very careful description of this species has been given by DE SELYS in the monograph. The male paratype, examined

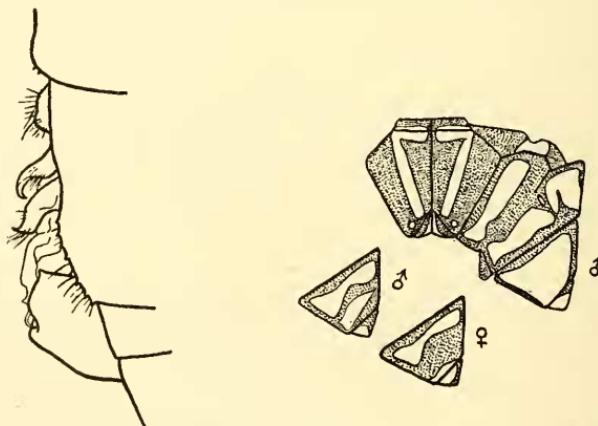


Fig. 23. — *Onychogomphus geometricus* SELYS, ♂. Samarang. — Genitalia, second segment, left side view.

Fig. 24. — *Onychogomphus geometricus* SELYS, *a*, synthorax ♂ (Samarang); *b*, metepimerum ♂; *c*, idem ♀ (Java).

by me, is slightly smaller than usual and possesses only three cells in the anal triangle of the hind wing, instead of four. HAGEN's drawings in the same work are very good, the basal tooth on the inferior appendage of the ♂ (rather

blunt in some specimens), being correctly shewn. A drawing of the accessory genitalia of the ♂ and a second of the thoracic colour-pattern, both drawn from the Samarang specimen, may still be of use. Two additional shemes of the metepimerum in a male and female specimen, present in the Mus. of Amsterdam, may point to a considerable variability in the extension of the yellow colour (figs. 23 and 24a-c)

So far as we know at present, the species is confined to Java.

Onychogomphus banteng, sp. nov. (figs. 25—27).¹⁾

1 ♂ ad. — W. Java, Preanger, Djampangs, Pandan-Aroem, 1000 m., VI. 1916, Prof. Dr. W. ROEPKE leg.

Head black, marked with bright yellow, as follows: Labium, base of mandibles, genae, two small oval spots on the labrum at base, anteclypeus and a greenish yellow fascia on the horizontal part of the frons, this colour divided into two distinct parts by a minute median triangle of black. Vertex, epicranium and occiput entirely black. Occiput with a double row of black hairs. Prothorax black. Ground-colour of synthorax warm reddish black, with sharply defined markings of a clear greenish yellow colour. Mesothoracic collar narrowly interrupted by black in the middle line, joining with narrow and completely straight humeral bands, almost reaching the antealar ridge. Median dorsal carina with an exceedingly fine yellow line, anteriorly. Posterior half of the antealar ridge also yellowish. No traces of antehumeral spots. Metepisternum entirely black, with a vestigial rest of a spot close behind the dorsal suture. Meso- and metanotum, like as the postnotum (of mesothorax only) yellow. Coxae, meso- and metinfraepisternum dirty yellowish brown (fig. 25). Ventral surface blackish, with flesh-coloured sutures. Legs entirely black; outer sides of the trochanters yellowish.

Wings tinged with yellow all over, nervures black. The venation is that characteristic for the genus. Nodal index: $\frac{11.16}{11.10} \frac{17.10}{12.11}$. Anal triangle of hind wing with $3 + 1$ cells. Anal loop two-celled. Only one postanal cell between anal

¹⁾ banteng = *Bos sundicus* RAFFL. — (cranium).

loop and anal triangle. Postanal field of front wing, proximal to the discoidal triangle, with 3 and 2 doubled cells. Pterostigma black. Membranula whitish.

Abdomen very slender, longer than wings, swollen at its base and very considerably enlarged from segm. 8—9. The dilatation begins abruptly at base of 8th segment, the apical half of the 7th being scarcely enlarged; it attains its maximum at the end of segm. 8. Colouring largely black, with small paired dull orange spots on segm. 2—7. Segm. 1 black, with

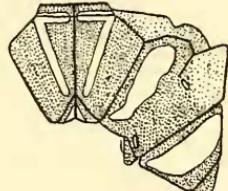


Fig. 25. — *Onychogomphus banteng*, ♂, holotype. — Synthorax.



Fig. 26. — *Onychogomphus banteng*, ♂, holotype. — Genitalia, second segment, left side view.

a minute spot at the sides, close to the anterior border. Segm. 2 with a narrow longitudinal stripe, pointed distally, and an irregular basal patch of dull orange at the sides. Auricles clear yellow. Genitalia black; inner (posterior) hamule yellowish. The very narrow paired parchment-like ligaments at the distal end of the glans penis, are much longer than in *geometricus* ¹⁾ (fig. 26). Segm. 3—6 with paired diamond-shaped spots at base, occupying $\frac{1}{5}$ of these segments. On segm. 7 the spots are joined to form a straight cut ring of

¹⁾ In *geometricus* these paired ligaments are more widely separated and much shorter than in *banteng*; in my Samarang specimen each of them rests against a groove of the vesicle, which partly covers the distal portion of the penis (cf. fig. 23 and 26).

dull orange, occupying almost the basal half of the segment. Segm. 8—10 wholly black above, but 8 bears a very small rounded spot at each side below. Anal appendages, upper pair a trace longer than segm. 9 + 10, *very dark brown*, somewhat lighter only at extreme base and at the tips (reddish brown); nearly parallel, curving downwards in their distal half, each carrying 5 teeth at the end, interiorly. Lower appendage black, one-fifth as long again, without any indication of a basal tooth or protuberance; its branches widely separated at base by a cordiform space, *their basal third strongly bent downward*, then approximated (fig. 27).

Length: abd. + app. 39, hw. 31, pt. 3.6 mm.

This interesting and very distinct species shows undeniable relation to the Section IV, of *biforceps* SELYS, defined by F. F. LAIDLAW (*Rec. Ind. Mus.*, Calcutta, 24, 1922, pp. 406—407). The principal characters of this section are: 1°. Coloration largely black, yellow markings more or less reduced;

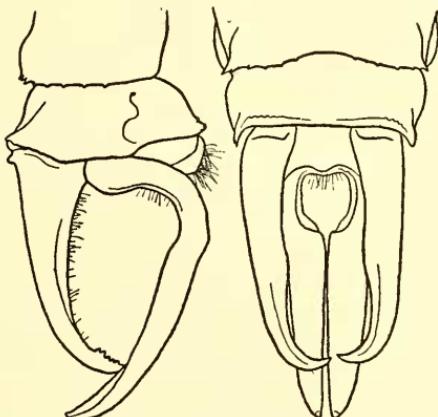


Fig. 27. — *Onychogomphus banteng*, ♂, holotype. — Appendages, right side and dorsal view.

2°. Apical segments of abdomen abruptly and considerably dilated; 3°. Lower anal appendage very long, with its branches separated at their origin by a more or less circular space, strongly bent downward for their proximal portions. According to LAIDLAW the species *acinaces* LAID., *camelus* MARTIN and *biforceps* SELYS must be placed in this group.

In an Appendix, completing LAIDLAW's paper (op. cit.), FRASER erects a new genus *Lamelligomphus* for the group *biforceps* of *Onychogomphus*, evidently with *biforceps* SELYS as genotype; in this paper the author describes the larva of his new subspecies *biforceps nilgiriensis*, which is peculiar in having a considerably flattened body, stout apical lateral spines on segm. 7—10, robust spines on the dorsal ridge of segm. 4—8, short mask, and very peculiar leaf-like distal joint of antennae (l. c., fig. a-c). These larvae were found amongst debris in a pool of a mountain stream. Later on FRASER alters the name of his new genus in *Lamellogomphus* and describes three other new species belonging to it (*J. Bombay Nat. Hist. Soc.*, 29, 1924, pp. 983—990, figs.). As it is unknown to the writer how far the genus *Lamelligomphus* can be accepted (he has not seen FRASER's paper 1924), the question about the generic position of *O. banteng* remains unanswered for him.

O. banteng is the second representative of the genus reported from the island. — (The Museum collection of Leiden possesses a third, hitherto undescribed species from Java, but as the only specimen lacks its head, I would like to await further material of it, before giving a description). — Holotype in my collection.

***Mesogomphus reinwardti* DE SELYS 1854 (figs. 28—30).**

Onychogomphus reinwardti ♂♀ Selys (*Synopsis des Gomphines*, 1854, pp. 19—20). Mus. Brussels and Berlin. — Hab.: Java.

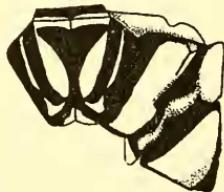
„ „ ♂♀ Selys (*Monographie des Gomphines*, 1857, pp. 60—62, pl. 3, fig. 6). — Same specimens.

„ „ Williamson (*Proc. U. S. Nat. Mus.*, 33, 1907, pp. 310—311). — Keys.

„ „ Laidlaw (*Rec. Ind. Mus.*, Calcutta, 24, 1922, p. 404). — Section II, of *O. lineatus* SEL., transferred to genus *Mesogomphus*.

In a lot of Javanese Odonata, collected for me by Mr. F. C. DRESCHER (Bandoeng), I found several males of this graceful

species. Examination of the insect makes it evident that it represents DE SELYS' *reinwardti*. *Mesogomphus reinwardti* has been known heretofore only from the types, a single male specimen, lacking its terminal abdominal segments (very probably collected by REINWARDT, previously in the Leiden Museum and later deposited in DE SELYS' collection), and a single complete female specimen in Mus. Berlin. Both were very briefly characterized by DE SELYS in the year 1854 in his Synopsis; a more complete description of both sexes appeared in the Monographie des Gomphines 1857 (1858). Except for the above mentioned examples, the species has remained unknown until the previous year. As already hinted by LAIDLAW (loc. cit.) and, properly speaking, by DE SELYS too, *reinwardti* is a true *Mesogomphus*, a genus containing a very homogeneous group of insects of wide range, distributed over the Mediterranean isles, Africa, and tropical Asia as far as Celebes. The genus is allied to *Onychogomphus*¹⁾, but differs from it by the undeveloped anal loop in the hind wing, by the leaf-like expansions of the male abdominal segments 8 and 9 and by the peculiar chamois horn-like upper appendages in the same sex, Fig. 28. — *Mesogomphus reinwardti* SELYS, ♂, pleurotype. — Synthorax.



¹⁾ As shown by FRASER (*Rec. Ind. Mus.*, Calcutta, 24, 1922, p. 426) the wing-pads in the larva of *M. lineatus* SEL., from India, are running parallel to each other, whilst in *Onychogomphus* the wing-pads are always widely divergent at their apices. This seems also to be the case in the African *M. hageni* SELYS, as stated by the late RENÉ MARTIN (cf. RIS, *Ann. South Afric. Mus.*, 18, 1921, p. 343).

Most of the specimens, which I have, fit DE SELYS' description closely, but the species seems to vary a little in the extension of the black markings on the thorax.

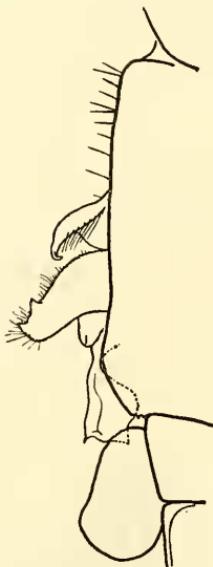


Fig. 29. — *Mesogomphus reinwardti* SELYS, ♂, plesiotype. — Genitalia, second segment, left side view.

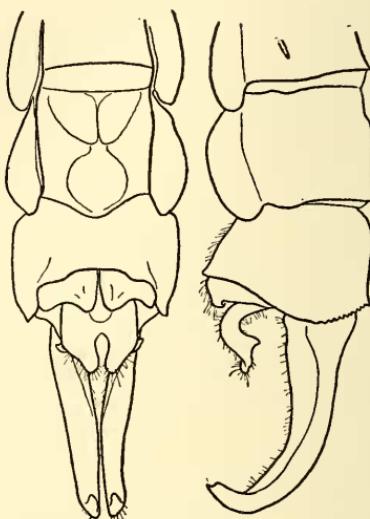


Fig. 30. — *Mesogomphus reinwardti* SELYS, ♂, plesiotype. Terminal segments, left side and ventral view.

Material studied: 8 ♂ ad., Java mer., res. Banjoemas, Djerocklegi, 13 and 16. XI. 1928, leg. F. C. DRESCHER. ("Low hilly grounds from 10—100 M., north of rail-road Maos—Bandjar; usually stagnant water; water-sources only after rainfall"). — Coll. m.

DE SELYS' conscientious description may be amplified as follows: ♂ ad. (plesiotype, 13. XI. 1928). — Ground-colour of head clear yellow, of dorsum of synthorax likewise but with a distinct greenish hue; sides clear greenish yellow. Black markings dark brown on the dorsum, warm purplish brown at the sides. Sutures slightly pruinose. Thoracic pattern (fig. 28).

Wings short, evenly and very slightly tinged with yellow. Reticulation brown. Costa yellow. Pterostigma large, deep black. Nodal index:
$$\frac{6.11}{8.9} \mid \frac{11.6}{9.7}$$
. Genitalia very characteristic

(fig. 29). Inner hamule shaped as in most of the other species, its extero-lateral margin with a row of straight bristles; outer hamule much longer, with a conspicuous tooth near its end.¹). Visible end of the penis shovel-shaped. Vesicle rounded.

Abdomen rather stout, similar in form to the African members of the genus, but less slender; moderately dilated at segments 1-2; 3-7 cylindrical; 8-10 rather considerably extended in lateral and dorsoventral dimensions, foliate dilatations of segm. 8-9 large. Deep black, with yellow and ochreous markings (those on segm. 1-2 yellow, on 3-10 ochreous). On 7 the light marking occupies somewhat more than the basal half of the segment. Extension of light colour on the three terminal segments variable. In the adult specimen, chosen by me as the plesiotype, the whole dorsum of 8 and 9 is obscure, except narrow yellow apical rings; foliaceous dilatations and large irregular lateral marks bright ochreous. Proximal half of segm. 10 with a trilobed black ring.

Appendages black, except the extreme base of the superior ones (fig. 30). — [In three other specimens the extreme base of segm. 8 is black, followed by a large triangular yellow mark on the dorsum, continuous with the lateral yellow].

Length: abd. + app. 34, hw. 25.5, pt. 3.6 mm.²).

Gomphidia caesarea, sp. nov. (figs. 31-32).

1 ♂ ad. — Central W.-Borneo, Lebang Hara, 25. XI-5. XII. 1924, Prof. H. WINKLER leg.

Allied to *G. abbotti* WILLIAMSON.

Head black, largely marked with yellow. Labium dull brownish yellow; base of mandibles yellow, finely bordered with black. Labrum yellow, with a diffuse brownish patch in the centre, continuous with the basal and apical brownish borders. Lower part of the orbita, anteclypeus and extreme

¹) Cf. also H. A. HAGEN's drawings of the genital organs, in "Mon. des Gomphines".

²) Measurements of the other specimens are: 33.5-36, 24-26, 3.1-4 mm.

tips of lateral lobes of the postclypeus bright yellow. Anterior half of the upper part of frons clear yellow, this pale area nearly divided by a broad low triangle of black, continuous with the basal black of the frons. Vertical part of frons for its lower half sharply defined black. Just behind each of the two lateral ocelli the epicranium bears a strong pointed triangular protuberance, black in colour. Occiput high, rounded but with very slightly crenulated centre and with golden hairs on either side. Behind the eyes black. Prothorax very dark brown. Synthorax warm brownish black, marked with light greenish yellow as follows: wide mesothoracic half collar, interrupted in the middle line; short, widely divergent, somewhat cuneiform stripes on either side

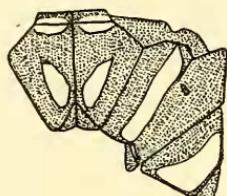


Fig. 31.—*Gomphidia caesar*, ♂, holotype. — Synthorax.

above, beginning just in front of the antealar sinus and reaching about half-way to the mesothoracic half collar. Antehumeral stripe absent. Mesepimeron with a stripe a little more than 1 mm. wide, of nearly uniform width for its entire length; extreme upper end of mesepimeron with a very narrow yellow border (fig. 31). Posterior $\frac{2}{3}$ part

of metepimeron greenish yellow, but the extreme ventral and distal borders of it are dark brown. Whole sternum brown. Legs black, coxae and femora (exclus. knees), brown. — Wings hyaline. Pterostigma braced, very long, covering 6—7 cells, dark brown. Nodal index: $\frac{13.21}{13.15} \mid \frac{21.14}{15.13}$ (*abbotti*: $\frac{11.19}{11.12} \mid \frac{18.9}{13.10}$). Triangle in front wing with 4, in hind wing with 2 or 3 cells.

Subtriangle in front wing once divided, in hind wing free. Cross veins in supratriangles $\frac{2.2}{1.2}$. $C_{ux} \frac{3.3}{2.2}$. Discoidal field in all wings beginning with one row of 3 cells, then 2. Anal triangle with 5 cells.

Ground-colour of abdomen very dark brown, almost black. Segm. 1 dark brown, somewhat less obscure above. Segm. 2 with a large triangular clear yellow spot above and a still

larger yellow mark, including the auricles, aside. This yellow lateral mark embraces a diamond-shaped black point just behind the distal border of segm. 1. Segm. 3—5 with large yellow spots, occupying about $\frac{1}{8}$ of the segments and on 4—5 divided posteriorly in the median line by the encroaching black. Segm. 6 only with two minute dorsal spots at base. Segm. 7 with a large yellow mark, occupying about $\frac{2}{5}$ of it and produced slightly posteriorly in the median line. Segm. 8 black with a small orange basal line on each side. Segm. 9—10 and appendages wholly black. — Reduced genital lobe entirely without teeth on the margin; lamina anterior not prominent, in profile view almost invisible, rounded and strongly ciliated; median third knoblike, shining black. Inner hamule slender, pointed and directed inward apically, not reaching apex of outer hamule; this broad, platelike, extending well beyond the vesiculum, elongated-triangular in general shape, with rounded apex.

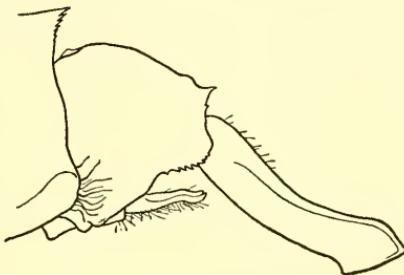


Fig. 32. — *Gomphidia caesarea*, ♂, holotype. — Appendages, left side view.

Vesicle small, procoel. Distal $\frac{2}{3}$ of inner hamule, intero-apical border of the outer and distal half of vesicle clear yellow.

Anal appendages (fig. 32). App. sup., seen from aside, distinctly turned up at distal end; app. inf. perfectly straight, their apices bifid.

Length: abd. + app. 56, hw. 45, pt. 6 mm.

The specimen is the holotype. Mus. Hamburg.

Though this new species has many characters in common with *G. abbotti* WILLIAMSON, from Lower Siam,¹⁾ it cannot be united with it for the following reasons:

1. The size is larger (*abbotti*: 53.5, mm.), and the nodal index is widely different.
2. Yellow markings on the labrum larger.
3. Legs largely black (*abbotti*: only apices of femora and tibiae black).

¹⁾ *Proc. U. S. Nat. Mus.*, 33, 1907, pp. 282—284, figs. 9—10, (wings and anal appendages).

4. Sides of segm. 2 largely yellow.
5. There are no yellow abdominal *rings* on segm. 3—7, but merely *spots*.
6. Spots on segm. 6 obsolete (*abbotti*: occupying $\frac{1}{3}$ of the segment).
7. Segm. 9—10 black (*abbotti*: with small basal and median spots, respectively).
8. Apices of sup. app. distinctly upturned (*abbotti* almost straight) and inf. app. straight (in *abbotti* perspicuously upturned).

In *Gomphidia*, like as in the genus *Ictinus*, a discrimination based on structural characters is by no means easy and in many cases does not give satisfaction, owing to the relative scarcity of these gorgeous insects, usually brought home only in solitary examples from widely different countries. The two species of *Gomphidia*, already known from the island, are *maclachlani* SELYS and *kirschi* SELYS. Of these I have but little doubt the latter, which is a small species, can be at once left out of consideration; of *maclachlani* I have examined a good female from Bettatan, N. Borneo, kindly lent to me by Dr. LAIDLAW; it is a much smaller insect (though larger than *kirschi*) and it is impossible to me to refer the brightly coloured *caesarea* male to this species. In a recent paper (*Zoöl. Mededeelingen*, Leiden, X, 1927), Dr. RIS discusses a male *Gomphidia* from Sumatra (Padang-sche Bovenlanden), which he considers to be somewhat intermediate between *abbotti* and *maclachlani*; in the same paper the specific value of the Siamese *abbotti* is called in question, and all Sumatran *Gomphidia* are referred by the author to *maclachlani*.

Hence *maclachlani* should be taken as an extremely variable species, not only on Sumatra, but also on Borneo. In my opinion the difficult matter can only be settled when more material is available. For the present, I am strongly leaned to adjudge specific value both to *G. abbotti* WILLIAMSON and to the large Bornean insect, although in future it may perhaps be necessary to give it subspecific rank. One

should bear in mind however, the widely different habitat of the two species.

APPENDIX.

Xiphagrion cyanomelas DE SELYS, 1876 (figs. 33—34).

Xiphagrion cyanomelas ♂ ♀ Selys (*Synopsis des Agrionines*, *Agrion*, suite, 1876, pp. 77—78). — Hab. Moluccas.

„ *karschi* ♂ Ris (*Entom. Nachrichten*, 24, 1898, p. 326). — Hab. Bismarck Archip.

„ „ ♂ Ris (*Archiv f. Naturgesch.*, I, 1900, p. 197). — Same habitat.

„ *cyanomelas* Ris (*Abh. Senckenb. Nat. Ges.*, 34, 1913, pp. 518—519, Taf. 23, fig. 11—12). — Hab. Aroe-Islands. On p. 519, *X. karschi* is withdrawn.

„ „ ♂ ♀ Ris (*Tijdschr. v. Entom.*, 58, 1915, p. 12 and 21). — Hab. I. Simaloer.

„ *karschi* Ris (*Nova Guinea*, Zool., 13, 1915, p. 121). — In this "Katalog" the name *X. karschi* reappears.

„ *cyanomelas* Campion (*The Entomologist*, 54, 1921, pp. 262—264). — Hab. Amboina.

10 ♂, 1 ♀ ad., Java occ., G. Tangkoeban Prahoe, 5000 ft., 5. I. 1929, leg. F. C. DRESCHER.

♂ ad. — Head black, marked with bluish green. Labium flesh-coloured. Labrum bluish, somewhat darkened, with narrow black fascia at base. Anteclypeus, base of mandibles and genae bluish green. Postclypeus dull black. Vertical part of frons with a transverse bluish green band, narrowly interrupted in the middle line. Vertex, epicranium and occiput entirely black, without any trace of postocular spots.

Prothorax black, sides blue; posterior lobe very narrowly bordered with blue, except in the median line. Dorsum of synthorax black. Rather broad blue antehumeral stripes, nearer the humeral than the median suture, less than half as broad as the humeral black band. Below, the antehumeral

stripe is somewhat broadened, club-shaped. Humeral black extending laterally to be devided about equally by the humeral suture. Sides otherwise pure blue; a small black dot in dorsal end of second lateral suture. Coxae blue. Legs largely black; inner side of femora broadly bluish, outer sides of tibiae narrowly yellowish, tarsi black.

Position of M_2 and M_{1a} relatively to postnodal cross-veins: $\frac{6+2}{4+3} \mid \frac{6+2}{4+3}$ (type of the series), or $\frac{5+3}{4+3} \mid \frac{5+3}{4+3}$, (the most frequent position of M_2 in front wing being between 5th and 6th Px). Ac exactly between first and second antenodal in all specimens. Pterostigma oblique, *unequal* in front and hind wings, much higher than long, covering less than one cell. Very dark, almost black and heavily framed.

The structure of the *penis* is interesting, as it shows a row of fine lateral setae on the distal part of the shaft (first segment of KENNEDY, 1916), as in the species of *Aciagrion*.

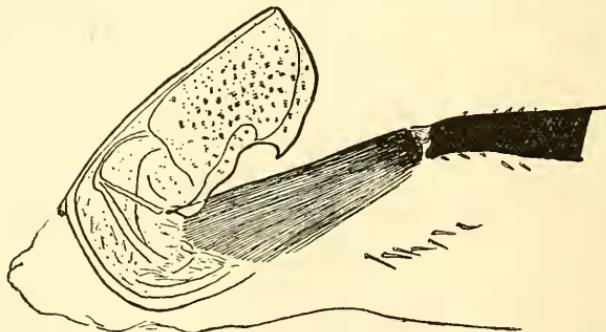


Fig. 33. — *Xiphagrion cyanomelas* SELYS, ♂, Tangkoeban Prahoe.
— Lateral view of terminal parts of penis.

Contrary to this genus an internal fold is entirely absent. The inner surface of the distal end of the third segment is covered with a high number of extremely fine, shagreen-like denticles, placed in small groups of 3—4, close together. No larger spines and no marginal spurs. Seen from below, the apex of the third segment is broadly truncate and somewhat rounded (fig. 33).

Abdomen short, terminal segments gradually enlarged. Pure blue, without greenish shade, marked with black. Narrow quadrangular spot over the whole length of segm. 1;

articulation between segm. 1 and 2 blue. Segm. 2 with a complete, narrow dorsal band, slightly contracted at the end, where it joins a terminal black ring. Segm. 3 with black band, occupying the whole length, but, anteriorly, it is considerably narrowed and pointed, its point just meeting the apex of second segment. Hence, the sides of segm. 1 and 2 and *basal half of 3 remain largely blue*. Dorsum of 4—7, including the sides, black, with extremely narrow basal blue articulations. Segm. 8 bright blue, with a pointed, globular, black spot on the dorsum, which is broadly connected with the apex of the segment. Segm. 9 and 10

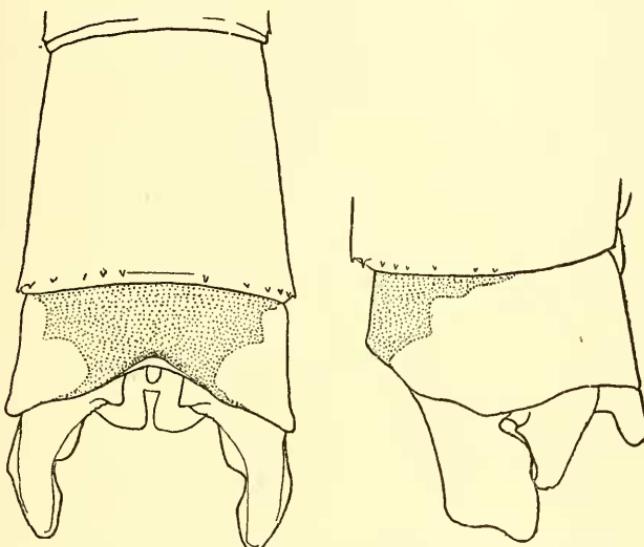


Fig. 34. — *Xiphagrion cyanomelas* SELYS, ♂, Tangkoeban Prahoe.
— Appendages, dorsal view and right side.

blue, the latter with a black mark on the dorsum. Anal appendages black (fig. 34).

Length : abd. + app. 24, hw. 16 mm. (Other specimens : 22—24, 15.5—16 mm.).

♀ ad. — Head as in the male. Light colours dull ochreous. Posterior lobe of prothorax black. Antehumeral stripes narrower, straight, not club-shaped below, about one fourth as broad as the humeral black. Colour of synthorax greenish ochreous laterally, dull yellowish beneath. Legs as in the male, brown instead of black.

M_2 and M_{1a} $\frac{5-6+2\frac{1}{2}}{5+2} \mid \frac{5-6+2\frac{1}{2}}{5+2}$. Postcostal vein as in the male. Pterostigma light brown. Black markings on abdominal segments 1—7 broader than in the male, that on segm. 3 not pointed at base. Dorsum of segm. 8 wholly black. Terminal one-third of 9 and 10 entirely dull bluish green. Strong vulvar spine. Excision of segm. 10 \wedge -shaped. Appendages blackish. Length: abd. 22, hw, 16.5 mm.

The above discussed examples, especially the males, are not quite identical with the type as described by DE SELYS.

In the first place complete and rather broad antehumeral stripes are present; secondly the upper anal appendages are only very slightly emarginate at their apices; lastly the size is much larger.

In the type male from the Moluccas the whole dorsum of the thorax is black, the tip of the upper anal appendage is "fortement échancré, comme bifide", and the specimen measures only 20.5 and 13 mm.

This species seems to be extraordinary variable, not only in its size, but also in the shape of the appendages and in its coloration. — In the males from Bismarck Archipelago for instance, the antehumerals are present, but interrupted in the middle and a black lateral suture is also present; the dorsum of segm. 2 is largely blue (as in *Enallagma cyathigerum*) and segm. 8—9 are entirely blue. — In the male specimens from Aroe a complete antehumeral stripe may be present or interrupted in the middle and a lateral black suture is absent; the black band on segm. 2 runs from end to end and segm. 8—9 are entirely blue. Moreover the pterostigmata in both front and hind wings and the costal side of the quadrangle are much longer than in the Javanese form; the anal appendages are also different (cf. RIS' figures, l. c.). — In the quite unexpected male specimens from Simaloer, the antehumerals are very short, the black spot on abd.-segm. 2 is variable, an oval black spot on the dorsum of segm. 8 is present and the upper anal appendages are deeply bifid. In the female from Simaloer the antehumerals are entirely absent.

In order to settle the true position of the races of *Xiphia-grion cyanomelas*, more material from very many localities is absolutely necessary. In view of the remarkable distribution, and considering the great variability of the several forms attending this phenomenon, it seems commendable for the present to retain the collective-name *cyanomelas* for all its widely separated settlements.

ERRATUM.

In the diagram representing the thoracic colour-pattern of *Heliogomphus drescheri* m., (fig. 12 on p. 122 of this paper), a vestige of the antehumeral stripe has erroneously been indicated near the upper end of the first lateral suture. As described in the text (p. 121), the true position of this spot is, of course, on either side close to the median side of the humeral suture.

M. A. L.
